

larger distances than the tangent plane approximation. At low latitude, especially in summer, the full form of  $a$ ,  $b$ ,  $c$  are needed since  $r_{uz'}(0) = r_{uz}$  is appreciably not zero.

In even the simplest case the coefficients  $r_{uz'}$ ,  $r_{vz'}$  are strongly direction dependent,  $r_{uz'} = r_{uz'}(R, \theta)$ ,  $r_{vz'} = r_{vz'}(R, \theta)$ . The wind provides more information on height in the direction perpendicular to the wind component than in the component direction (in the sense of a standardized variable). In fact, if the subscript  $t$  indicates the component transverse to the direction  $PP'$ , then  $r_{tz'} \simeq r_{tz'}(R)$ , a function of only the distance  $PP'$  (excluding low-latitude summer situations).

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### Reply

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With respect to Dr. Buell's first comment, one of the authors (Danard, 1965) has measured  $S_{\Delta}^2$  directly in the lower troposphere (below 10,000 ft). There was no appreciable difference between the values for the along- and across-wind directions over a distance of 15 mi. This conclusion would not necessarily be true over longer distances and would probably not be true in the upper troposphere. Nevertheless, the assumption that  $S_{\Delta}^2$  is a function of radial distance only is probably justified for the analysis of sea-level pressure. Moreover, it is not likely that this assumption would lead to serious error at 500 mb.

As for the second comment, it should be pointed out that the height or pressure is extrapolated to the nearest grid point only. At 60°N this is a maximum distance of only 270 km. It is even less at lower latitudes. Dr. Buell's suggestion may produce a more accurate estimate. However, it would not likely differ significantly from that produced by our method, because of the relatively small distances involved.

While both Dr. Buell's suggestions have merit, it is not obvious that the improvement would be sufficient to justify the more complicated computer programming required. Since objective analyses are performed routinely on a real-time basis, simplicity of method is desirable. Nevertheless, the authors wish to thank Dr. Buell for bringing up these points for discussion.

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